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10/605,882	11/04/2003	Chi-Cheng Ju	MTKP0124USA	2881

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EXAMINER	
FINDLEY, CHRISTOPHER G	
ART UNIT	**PAPER NUMBER**
2621	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/20/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/20/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/605,882	JU, CHI-CHENG	
	Examiner	Art Unit	
	Christopher Findley	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☒ Claim(s) *9 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :11/04/2003, 11/24/2003, 4/19/2006.

DETAILED ACTION

Claim Objections

1. Claims 9 and 20 are objected to because of the following informalities: claims 9 and 20 recite "global matching compensation." It is believed that this is a typographical error, and that the applicant intended to recite "global motion compensation." For the purposes of prior art examination, claims 9 and 20 will be interpreted as relating to global motion compensation. However, appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1-3, 12-15, 23-26, and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakaya (US 7006571 B1, hereafter referred to as "'6571").

Re claim 1, '6571 discloses an apparatus for performing motion compensation when decoding an incoming video bit stream including a plurality of frames having first macroblocks encoded using block-matching motion compensation (Fig. 11/1101) and second macroblocks encoded using global motion compensation (Fig. 11/911), the apparatus comprising: an interpolation unit for performing interpolation operations on

each macroblock contained in each frame of the incoming video stream (column 13, lines 56-61; the images are synthesized relative to the previously decoded images); wherein when processing a current macroblock, if the current macroblock is encoded using global motion compensation, the interpolation unit performs the interpolation operations according to a global motion vector on a per-macroblock basis (column 15, lines 2-8).

Re claim 2, '6571 discloses converting global motion information into representative vectors (Equations (5), (6), (7), and (8); the vector components are calculated from motion information parameters).

Re claim 3, '6571 discloses that when processing the current macroblock, if the current macroblock is encoded using block-matching motion compensation, the interpolation unit performs the interpolation operations according to at least one macroblock motion vector contained in the current macroblock (Fig. 11; column 15, lines 2-8).

Re claim 12, '6571 discloses that when performing the interpolation operations, the interpolation unit uses a bilinear interpolation process (column 3, lines 37-40).

Claim 13 is the corresponding method claim to the apparatus of claim 1 and has been analyzed and rejected with respect to claim 1 above.

Claim 14 has been analyzed and rejected with respect to claim 2 above.

Claim 15 has been analyzed and rejected with respect to claim 3 above.

Claim 23 has been analyzed and rejected with respect to claim 12 above.

Re claim 24, '6571 discloses a predicted image synthesizer in a video decoder for decoding a video bit stream and generating a predicted image (Fig. 7/711), the video bit stream including a plurality of frames having first macroblocks encoded using block-matching compensation (Fig. 11/1101) and second macroblocks encoded using global motion compensation (Fig. 11/911) , the video bit stream including macroblock motion vectors indicating motion vectors of the first macroblocks (column 14, line 64, through column 15, line 2) and global motion parameters associated with the plurality of frames indicating a motion vector of each pixel in the second macroblocks (column 14, lines 58-64), the predicted image synthesizer comprising: a translation unit receiving the global motion parameters, and translating the global motion parameters into a global motion vector which is in a form substantially identical to that of the macroblock motion vector (Equations (5), (6), (7), and (8); the vector components are calculated from motion information parameters), and a interpolation unit for receiving a decoded image which is a previously decoded frame, receiving the global motion vector, performing interpolation operations, and generating the prediction image (column 13, lines 56-61).

Re claim 25, '6571 discloses a demultiplexer receiving the macroblock motion vectors and global motion parameters, and respectively outputting the macroblock motion vectors and the global motion parameters, the global motion parameters are sent to the translation unit and translated into a global motion vector which is in a form substantially identical to that of the macroblock motion vector, and the interpolation unit selectively receiving the macroblock motion vector or the global motion vector to perform the interpolation operations (column 14, line 54, through column 15, line 8).

Re claim 26, '6571 discloses that the interpolation unit receives the global motion vector when a current macroblock is encoded using global motion compensation (Equations (5), (6), (7), and (8); column 14, lines 58-64).

Re claim 29, '6571 discloses that the interpolation unit receives the macroblock motion vector when a current macroblock is encoded using block-matching motion compensation (Fig. 11; column 15, lines 2-8).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakaya (US 7006571 B1, hereafter referred to as "'6571").

Re claim 4, '6571 discloses a multiplexer for selecting whether the interpolation unit uses the macroblock motion vector or the global motion vector (column 15, lines 2-

8); wherein when performing the interpolation operations on macroblocks encoded using block-matching motion compensation, the multiplexer outputs the macroblock motion vector to the interpolation unit, and when performing the interpolation operations on macroblocks encoded using global motion compensation, the multiplexer outputs the global motion vector to the interpolation unit (column 14, line 58, through column 15, line 2).

However, '6571 does not specifically disclose that either the block matching motion vector or the global motion vector are stored to a vector storage unit. The Examiner takes Official Notice that it is conventional to store such data into a buffer so that the vectors are retained until the processing steps relating to each block are completed. Therefore, one of ordinary skill in the art would have found it obvious to store the vectors into a buffer so that, due to the complexity of the calculations involved, the vectors could still be used for processing in the event of an error.

7. Claims 5-8, 16-19, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakaya (US 7006571 B1, hereafter referred to as "'6571") as applied to claims 1-4, 12-15, 23-26, and 29 above, and further in view of Nakaya et al. (US 20010050957 A1, hereafter referred to as "'50957").

Re claim 5, '6571 does not specifically disclose that the interpolation operations comprise luminance and chrominance interpolation operations. However, '50957 discloses interpolation using luminance and chrominance values (paragraphs [0012]-[0013]). Since '6571 relates to decoding images by processing motion vectors and

'50957 relates to preventing error accumulation in image decoding, one of ordinary skill in the art would have found it obvious to combine their teachings in order to improve the quality of the reproduced picture by eliminating error accumulation.

Re claim 6, '6571 does not specifically disclose that when performing the luminance interpolation operations on macroblocks encoded using block-matching motion compensation, the interpolation unit uses half-pel (or half-pixel) precision. However, '50957 discloses that, "the horizontal and vertical components of the motion vector for the Y block motion vector are integral multiples of ½ (paragraph [0016])." This describes half pixel precision for the luminance (Y) block. Since '6571 relates to decoding images by processing motion vectors and '50957 relates to preventing error accumulation in image decoding, one of ordinary skill in the art would have found it obvious to combine their teachings in order to improve the quality of the reproduced picture by eliminating error accumulation.

Re claim 7, '6571 does not specifically disclose that when performing the chrominance interpolation operations on macroblocks encoded using block-matching motion compensation, the interpolation unit uses half-pel (or half-pixel) precision. However, '50957 discloses that the ¼ pixel resolution chrominance blocks are rounded to ½ pixel precision (paragraph [0016]). Since '6571 relates to decoding images by processing motion vectors and '50957 relates to preventing error accumulation in image decoding, one of ordinary skill in the art would have found it obvious to combine their teachings in order to improve the quality of the reproduced picture by eliminating error accumulation.

Re claim 8, '6571 does not specifically disclose that when performing the luminance interpolation operations on macroblocks encoded using global motion compensation, the interpolation unit uses half-pel (or half-pixel) precision. However, '50957 discloses that, "the horizontal and vertical components of the motion vector for the Y block motion vector are integral multiples of ½ (paragraph [0016])." This describes half pixel precision for the luminance (Y) block. '50957 further discloses that this technique is applicable to global motion compensation in addition to block matching (paragraph [0052]). Since '6571 relates to decoding images by processing motion vectors and '50957 relates to preventing error accumulation in image decoding, one of ordinary skill in the art would have found it obvious to combine their teachings in order to improve the quality of the reproduced picture by eliminating error accumulation.

Claim 16 has been analyzed and rejected with respect to claim 5 above.

Claim 17 has been analyzed and rejected with respect to claim 6 above.

Claim 18 has been analyzed and rejected with respect to claim 7 above.

Claim 19 has been analyzed and rejected with respect to claim 8 above.

Re claim 30, '6571 does not specifically state that the interpolation operations include a luminance interpolation operation and a chrominance interpolation operation, the interpolation unit uses a first resolution to perform the luminance interpolation operation and uses a second resolution to perform the chrominance interpolation operation. However, '50957 discloses chrominance blocks in quarter pixel precision (paragraph [0016]) and that this technique is applicable to global motion compensation in addition to block matching (paragraph [0052]), but these blocks are rounded to the

same precision as the luminance block in order to lessen the computational complexity of interpolation. Since '6571 relates to decoding images by processing motion vectors and '50957 relates to preventing error accumulation in image decoding, one of ordinary skill in the art would have found it obvious to combine their teachings in order to improve the quality of the reproduced picture by eliminating error accumulation.

Re claim 31, '6571 discloses that when performing the interpolation operations, the interpolation unit uses a bilinear interpolation process (column 3, lines 37-40).

8. Claim 9, 20, and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakaya (US 7006571 B1, hereafter referred to as "'6571") and Nakaya et al. (US 20010050957 A1, hereafter referred to as "'50957") as applied to claims 1-8, 12-19, 23-26, and 29-31 above, and further in view of Srinivasan (US 20030202607 A1).

Re claim 9, '6571 does not specifically disclose that when performing the chrominance interpolation operations on macroblocks encoded using global motion compensation, the interpolation unit uses quarter-pel precision. '50957 discloses chrominance blocks in quarter pixel precision (paragraph [0016]) and that this technique is applicable to global motion compensation in addition to block matching (paragraph [0052]), but these blocks are rounded to half pixel precision in order to lessen the computational complexity of interpolation. Srinivasan, however, discloses a sub-pixel interpolation technique in motion estimation and compensation, which maintains the quarter pixel precision of the chrominance blocks (Fig. 18; paragraph [0183]). Since

'6571, '50957, and Srinivasan relate to image decoding utilizing motion compensation and interpolated motion values, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to improve the image quality of the reproduced picture.

Claim 20 has been analyzed and rejected with respect to claim 9 above.

Re claim 27, '6571 does not specifically state that the interpolation operations include a luminance interpolation operation and a chrominance interpolation operation, the interpolation unit uses a first resolution to perform the luminance interpolation operation and uses a second resolution to perform the chrominance interpolation operation. '50957 discloses chrominance blocks in quarter pixel precision (paragraph [0016]) and that this technique is applicable to global motion compensation in addition to block matching (paragraph [0052]), but these blocks are rounded to the same precision as the luminance block in order to lessen the computational complexity of interpolation. Srinivasan, however, discloses a sub-pixel interpolation technique in motion estimation and compensation, which maintains different resolutions for the luminance and chrominance blocks (Fig. 18; paragraph [0183]). Since '6571, '50957, and Srinivasan relate to image decoding utilizing motion compensation and interpolated motion values, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to improve the image quality of the reproduced picture.

Re claim 28, '6571 does not specifically state that the first resolution is a half-pel resolution, and the second resolution is a quarter-pel resolution. '50957 discloses

chrominance blocks in quarter pixel precision (paragraph [0016]) and that this technique is applicable to global motion compensation in addition to block matching (paragraph [0052]), but these blocks are rounded to the same precision as the luminance block in order to lessen the computational complexity of interpolation. Srinivasan, however, discloses a sub-pixel interpolation technique in motion estimation and compensation, which maintains the quarter pixel precision of the chrominance blocks (Fig. 18; paragraph [0183]). Since '6571, '50957, and Srinivasan relate to image decoding utilizing motion compensation and interpolated motion values, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to improve the image quality of the reproduced picture.

9. Claims 10-11 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakaya (US 7006571 B1, hereafter referred to as "'6571") as applied to claims 1-4, 12-15, 23-26, and 29 above, and further in view of Hagiwara (US 20040223550 A1).

Re claim 10, '6571 discloses that the decoder device that is intended for use with encoded bitstreams adhering to the MPEG-1, MPEG-2, and H.263 standards. However, Hagiwara discloses an MPEG-4 decoder, which includes the same principle processing steps of the MPEG-2 compliant decoder of '6571. More specifically, Hagiwara includes a motion compensation block (Fig. 11/8), which inputs a motion vector and reference frame and outputs a motion compensated reference frame to be added to the current frame being processed. Since both '6571 and Hagiwara disclose

MPEG compliant video decoders, one of ordinary skill in the art would have found it obvious at the time of the invention to combine their teachings in order to construct an MPEG-4 decoder which processes video with a very high compression rate.

Re claim 11, neither '6571 or Hagiwara disclose that the video decoder is capable of processing an incoming MPEG-4 video stream having a no_of_sprite_warping_point parameter set to either 0 or 1. However, The Examiner takes Official Notice that when the number of sprite warping points is set to either 0 or 1, the block either doesn't change position (set to 0) or is moved with respect to only one motion vector without warping the boundaries of the block (set to 1). Therefore, the block behaves like that of an MPEG-1 or MPEG-2 block, which is well known to one of ordinary skill in the art.

Claim 21 has been analyzed and rejected with respect to claim 10 above.

Claim 22 has been analyzed and rejected with respect to claim 11 above.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a. Method and apparatus for image coding

Suzuki (US 20030202595 A1)

b. Moving image estimating system

Sekiguchi et al. (US 6775326 B2)

c. Method and apparatus for image coding

Suzuki (US 6256343 B1)

d. Intraframe and interframe interlace coding and decoding

Hsu et al. (US 20050013497 A1)

e. Motion estimation and motion-compensated interpolation

De Haan et al. (US 6385245 B1)

f. Method and apparatus for improving motion compensation in digital video coding

Horne (US 5473379 A)

g. Method for coding motion in a video sequence

Lainema (US 20030202594 A1)

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Findley whose telephone number is (571) 270-1199. The examiner can normally be reached on Monday-Friday 7:30am-5pm, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher Findley/

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